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ECONOMIC NOTES NO. 5 JUNE 1936

FOREST AREAS AND TIMBER VOLUMES

IN

MICHIGAN

PRELIMINARY STATISTICS AND ANALYSIS OF DATA OBTAINED FROM FOREST SURVEYS AND OTHER ECONOMIC STUDIES BY THE

LAKE STATES FOREST EXPERIMENT STATION
UNIVERSITY FARM — ST. PAUL MINNESOTA

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

PUBLICATION OF THE

LAKE STATES FOREST EXPERIMENT STATION*

RAPHAEL ZON, DIRECTOR

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*Maintained by the United States Department of Agriculture at University Farm, St. Paul, Minnesota, in cooperation with the University of Minnesota.

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JUN 21 1936
RESEARCH
INTERMOUNTAIN

June 19, 1936.

Dear Sir:

I am mailing you copies of Economic Notes No. 4 and 5 dealing with the results of the Forest Survey in the Lake States Region. There is also enclosed a copy of a brief summary of the Survey statistics which was published in the June issue of the Hardwood Record.

Note No. 4 contains a description of the methods of the Survey and a definition of terms used in the various reports. It should be used in connection with all of the reports of the Survey series.

Note No. 5 gives the results of the timber inventory of Michigan just completed by this Station.

Very truly yours,

Raphael Zon

Director

NEW FOREST STATISTICS FOR LAKE STATES

R. N. Cunningham and H. C. Moser[1/]

June 19, 1936.

As an integral part of the nation-wide Forest Survey, conducted by the U. S. Forest Service, the work in the Lake States region has progressed far enough to permit release of some results. Field work has been completed in Minnesota and Michigan, and is now under way in Wisconsin.

Volume of Timber

The timber estimates for Michigan and Minnesota as made by this survey follow:

Standing Timber Volumes - 1935

Species	Volume in Thousand Board Feet (Lumber Tally)	
	Minnesota	Michigan
White Pine	1,598,200	1,010,000
Norway Pine	998,380	187,000
Jack Pine	2,262,790	169,000
Hemlock	-	6,550,000
Balsam Fir	350,310	606,000
Spruce	1,240,730	984,000
Tamarack	137,340	78,000
All Soft Wood	6,587,750	9,584,000
Sugar Maple	306,120	7,423,000
Yellow Birch	93,230	3,771,000
Beech	-	1,326,000
Basswood	451,200	760,000
Elm	701,690	1,248,000
Oak	761,790	1,211,000
Poplar	2,366,700	955,000
Miscellaneous*	1,186,260	2,271,000
All Hardwood	5,866,990	18,965,000
State Total	12,454,740	28,549,000

* Including Paper Birch and Red Maple.

1/ Lake States Forest Experiment Station, U. S. Forest Service, maintained in cooperation with the University of Minnesota, at St. Paul, Minnesota.

The new estimates are somewhat higher than those presented in the Forest Service "Copeland Report" of 1933. The 1933 estimates were based purely upon judgment of men familiar with conditions in the Lake States, whereas the new figures are the result of an actual field survey extending over three years and, of course, are more reliable. The present estimates include the volume of scattered timber left on cut-over lands, and the volume of small trees (10 and 12 inches in diameter at breast height) if these trees contain a merchantable sawlog. The estimate, therefore, includes smaller trees and lighter stands than are ordinarily considered by the average commercial cruiser.

The survey just completed shows considerably higher volumes of white and Norway pine than were credited to either of the States in 1933. The white and Norway pine volume of Minnesota has been increased from 1.7 billion feet to 2.6 billion, that of Michigan from .2 billion to 1.1 billion. This, of course, is only a pathetic remnant compared to the original stand of 70 billion feet in Minnesota and 190 billion feet in Michigan.

The volume of spruce, balsam, and hemlock is also somewhat greater than the 1933 estimate. More maple and birch were found in Michigan and less in Minnesota. There is more elm but less basswood than previously reported in these States. Merchantable oak sawtimber is very seriously depleted in both States.

Four-fifths of the timber in Michigan is in the Upper Peninsula.

Area of Forest Land

The total area of forest land in Michigan and Minnesota is approximately the same as previously reported, but some difference in type areas was discovered. The present split-up by forest cover types is as follows:

AREA BY TYPES - 1935

Forest Cover Type	Area in Thousands of Acres	
	Michigan	Minnesota
Pine	1,029	1,670.2
Northern Hardwood	4,576	893.6
Oak and Scrub Oak	1,350	1,018.4
Bottomland Hardwood	683	616.1
Spruce-Balsam	1,421	1,088.3
Coniferous Swamp	1,387	3,330.4
Aspen	5,045	6,875.3
Deforested	3,582	4,123.1
Total	19,073	19,615.4

There is a smaller area of pine type than previously supposed in spite of the fact that there is more pine sawtimber. Many pine trees, insufficiently grouped to constitute a true pine type, occur throughout the aspen, hardwood and spruce-balsam stands.

Forest Growth

Growth estimates are not yet available for Michigan or for the entire State of Minnesota. However, preliminary computations for four of the principal forest districts of Northern Minnesota indicate that current growth in that section

is greater than commonly supposed, and this may be true for the entire Lake States region.

CURRENT GROWTH IN FOUR MINNESOTA DISTRICTS - 1935

District	Acreage Forest Land	Annual Growth	
		Board Feet Per Acre*	Total MBM*
Cloquet	4,329,900	16.	67,887
Rainy River	3,808,400	22.	82,225
Superior	2,030,700	86.	175,042
Central Pine	5,284,900	28.	149,732
Total	15,453,900	31.	474,886

* Lumber Scale

The per acre growth, of course, is not large, but even if a nominal increment of 30 board feet per acre occurred on the 50 million acres of forest land in the Lake States, one and one-half billion board feet of timber would be added yearly which is greater than the cut during recent depression years. There is some indication, therefore, of an improved trend in the relation of growth to drain. Decreased logging and reduced fire losses largely account for this trend.

A large part of the current growth, however, is not of the kind or quality which will serve to put Lake States industries on a sustained yield operating basis. Much of the growth is of inferior species, scattered on the cut-over areas. A large share of it will not be available for cutting for 40 or 50 years. To provide a permanent supply of timber for existing industries requires constructive management of the remaining

mature and second growth stands to preserve and build up present growing stock and add new growth by every means possible.

The situation is not hopeless for the survey shows that nature is working valiantly to restore to productivity the forest lands in Michigan and Minnesota, and also that there is still enough timber, if properly managed, to permanently maintain a large share of the existing forest products industries.

The Lake States Forest Experiment Station plans to issue a series of economic unit reports, state reports and ultimately a regional report as a result of the Forest Survey, which will make recommendations as to policies and plans for proper forest land-use management in the Lake States area. Three unit reports have already been issued and additional unit and State reports will follow in the near future. These reports may be had free upon application to the above station.

LAKE STATES FOREST EXPERIMENT STATION

ECONOMIC NOTE NO. 5

JUNE 1936

FOREST SERVICE — U. S. DEPT. OF AGRICULTURE

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MAP OF

MICHIGAN

SHOWING

ECONOMIC UNITS

RECOGNIZED BY FOREST SURVEY

FOREST AREAS AND TIMBER VOLUMES IN MICHIGAN*

FOREWORD

Fundamental to sound planning in either public or private forestry are reliable basic data on the local and national timber situation.

From time to time, estimates have been made of the volume of timber left standing in the country. Current rate of growth has been computed and contrasted with the rate of depletion, and forecasts made of future timber needs. At no time, however, until the National Forest Survey was authorized by the McSweeney-McNary Act in 1928 was any systematic effort made to carry on a complete field survey to gather the needed information. The present Forest Survey, which is now under way in most of the important forest regions of the country, is such a field survey. The five-fold aim of this survey is:

(1) Inventory. To take stock of the supply of timber and other forest products and the areas of land available for growing timber. This information is collected by natural economic units tributary to certain groups of wood-using industries. Ownership and availability of the timber are also considered.

(2) Growth. To ascertain the current rate of growth and the growth prospects under different types of management - mere protection, extensive management, and intensive management.

(3) Drain. To determine the rate of depletion from industrial and local timber use, windfall, fire, insects and disease.

(4) Requirments. To determine the present consumption and the probable future trend in the requirements for timber and other forest products.

(5) Policies and plans. To correlate these findings with existing and anticipated economic conditions in order that policies can be formulated for the effective use of land available for forest production.

The statistics on forest areas and timber volumes presented in this report are derived from the Forest Survey of Michigan completed in 1935 by the Lake States Forest Experiment Station. No attempt is made in this report to analyze the data or to interpret their significance. In response to many requests for advance information, they are released without accompanying textual analysis.

Later, these statistics will be analyzed and interpreted in conjunction with information on rates of timber growth, existing industries, prospective requirements, and related physical and economic data. The results will be reported for each economic unit, for each state, and for the Lake States region as a whole. These reports will set up guiding principles for the formulation of forest and land-use plans and policies.

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* This report contains preliminary figures subject to revision. In using data from this release it is suggested that the reader familiarize himself with the several bases of classification and the standards of estimating followed in the field work of the survey. These are defined and described in abbreviated form in the following pages, and in greater detail in the Economic Note No. 4 accompanying this report.

ESTIMATING STANDARDS AND DEFINITIONS OF TERMS

NON-FOREST LAND CLASSES*

Urban and Platted - All platted areas except wholly undeveloped "boom" projects.

Improved Farm - Crop, fallow land and cleared pasture. Includes also farmsteads, hay meadows outside of farms, and undeveloped platted areas.

Rights-of-Way - Highways and railroads. Transmission lines are also included.

Miscellaneous Industrial -

Legal sub-divisions embracing iron mines, gravel pits, and small, unplatted settlements.

Unused Open Land - Naturally non-forest brush and grass areas including alder brush and open natural meadows not used for hay land.

Unsurveyed Waters - Includes stream-beds, 2 rods and wider, unmeandered lakes, and small areas of beach and rock outcrop.

Open Bog and Marsh -

Includes only naturally non-forest areas supporting sedges, rushes, alder, scrubby willow, leatherleaf and Labrador tea.

FOREST COVER TYPES

Stands are classified into forest cover types according to the dominance of a key species or group of species. The jack pine cover type, for example, includes stands consisting of 50 per cent or more of this species. "Mixed" cover types, such as spruce-balsam, hemlock-hardwood, and aspen-birch, are characterized by dominance (50 per cent or more) of the group of indicator species. Thus the spruce-balsam type is typically a mixture of white spruce, balsam fir, cedar, aspen, birch and a smattering of other hardwoods growing on upland soils. If these species collectively comprise half the stand, the type is classed as spruce-balsam. Mixed types may vary considerably in the proportion of species in the several districts of the state.

In merchantable stands species dominance is determined by volume of sawtimber or cordwood; in unmerchantable stands, by the number of unsuppressed stems 2 inches or more in diameter.

Where reference is made to "land type" as for instance "Hardwood Land" in the

*The gross land areas used as a basis for computing forest cover types were obtained from the Office of Government Surveys, Lansing, Michigan. These differ slightly from those reported in the U. S. Census of Agriculture.

chart facing Table 2, all areas naturally adapted to the growing of hardwood timber are included even though at present occupied mainly with aspen, grass or brush.

SIZE CLASSES

Forest cover types are further subdivided according to the size and volume of timber.

Sawtimber Stands - are those having at least 2,000 board feet per acre of timber suitable for sawlogs. If more than half of the volume occurs in trees over 15 inches in diameter at breast height, the stand is classified as OLD GROWTH, if more than half occurs in smaller trees the stand is classified as SECOND GROWTH SAWTIMBER.

Cordwood Stands - are those having 3 cords or more per acre of trees 5.0 inches or larger, exclusive of sawtimber trees, but with less than 2,000 board feet of timber suitable for sawlogs.

Restocking Areas - have at least 10 per cent of the ground occupied by trees less than 5.0 inches in diameter, but support less than 3 cords of larger material.

Deforested Areas - are natural forest lands which at present do not qualify for any one of the above classes.

Sawtimber and cordwood areas are referred to collectively as "merchantable" stands in some tables. Restocking and deforested areas are similarly called "scattered" stands.

SPECIES

Timber volumes are presented separately for most species. Some of the less common hardwood species are grouped. Miscellaneous hardwood species include ironwood, willow, butternut, walnut, black cherry, hickories, ash (principally black ash), hackberry, yellow poplar, Kentucky coffee tree, sycamore, locust, and soft maples.

All species of elm have been grouped under one heading. The several species of oak are likewise grouped. Poplar includes trembling aspen, large-toothed aspen, cottonwood, and balm-of-Gilead.

Blue beech, pin (red or fire) cherry, witch hazel, alder, mountain maple and crab apple, all of shrub type, have been excluded from volume estimates.

MERCHANTABLE PRODUCTS

Volume Estimate - includes only living trees.

Sawtimber - includes trees 9.0 inches or more in diameter at breast height which will yield a 10-foot log of high quality or a 16-foot log of low quality, having a diameter inside bark at the small

end of not less than 8 inches in hardwoods or 6 inches in softwoods and aspen. All sawlog volume is measured by the Scribner Decimal C Log Rule, except where indicated otherwise in the tables. Cedar is estimated in terms of piece products, but not as sawtimber.

Pulpwood - includes spruce, jack pine, balsam fir, tamarack, hemlock and aspen trees, not of sawtimber quality, large enough to yield at least two 8-foot sticks to a 4-inch top and tops from sawtimber trees of the above species yielding at least one 8-foot stick. No wood is classified as pulpwood which is suitable for sawtimber, although many sawlogs from the above species are suitable and may be used for pulp.

Cedar Poles - are at least 16 feet long to a 5-inch top.

Cedar Posts - are 7 feet long to a 4-inch top. Split posts include some material suitable for shingle bolts, lagging and dimension stock.

Cordwood - is measured in terms of standard cords, 4' x 4' x 8'.
SMALL TREES include those 5.0 inches or larger in diameter at breast height, which are unsuitable for sawtimber. Pulpwood in small trees is included in the cordwood volume. The volume of stumps and all wood less than 4 inches in diameter is excluded.
TOPS and LIMBS include non-sawlog material in sawtimber trees to a 4-inch minimum top diameter. Limbs are excluded in softwood species. Pulpwood in tops is included in the volume of tops and limbs.
CULL is the volume of trees now unsuitable for either sawtimber or pulpwood and which can never attain merchantability because of form or defect.

Total Cubic Volume -

is the total volume excluding bark, from stump to a minimum 4-inch top diameter of all living trees 5.0 inches or larger in diameter. Limbs are included for hardwoods, but not for softwoods.

High Quality Hardwood Logs -

log grades must be at least 10 feet long, 8 inches in diameter at the small end and 75 per cent sound; and may be expected to yield 30 per cent or more No. 1 common or better lumber. Logs less than 10 inches in diameter must be surface clear, straight and sound.

Low Quality Hardwood Logs -

need not meet the above specifications but must be 8 inches or larger, 50 per cent sound, and suitable for production of timbers or low grade lumber, such as box and crating material. These logs correspond closely to the poorer class now being logged on operations practicing close utilization.

Most low quality jack pine, spruce, balsam fir, tamarack and hemlock logs were classified as pulpwood and thereby excluded from sawtimber volume, whereas low quality white and Norway pine logs, were included in sawtimber volume.

TABLE 1

GENERAL CLASSIFICATION OF LAND

IN FOUR ECONOMIC UNITS

Michigan 1935

Areas in Acres

Class of Land	Entire State	UPPER PENINSULA		LOWER PENINSULA	
		West Half	East Half	North Half	South Half
NON-FOREST					
Urban & Platted	525,000	17,000	11,000	52,000	445,000
Improved Farm *1*	14,401,000	304,000	379,000	2,670,000	11,048,000
Rights of Way	816,000	56,000	60,000	230,000	470,000
Miscellaneous Industrial	365,000	69,000	21,000	82,000	193,000
Open Bog and Marsh *2*	472,000	34,000	86,000	90,000	262,000
Other Unused Open Land	451,000	37,000	60,000	116,000	238,000
Unsurveyed Waters	297,000	68,000	33,000	93,000	103,000
TOTAL NON-FOREST	17,327,000	585,000	650,000	3,333,000	12,759,000
FOREST	19,073,000	4,986,000	4,350,000	7,441,000	2,296,000
GROSS LAND AREA	36,400,000	5,571,000	5,000,000	10,774,000	15,055,000
Percent Forest	52.4	89.5	87.0	69.1	15.3

1 This acreage exceeds figures on plowable land reported by the U.S. Census, due to inclusion of farmsteads, very small farms and wild meadows used for hay land.
2 Open bog and marsh includes only naturally non-forest areas. Deforested swamps are classified as forest land.

TABLE 2

ACREAGE OF FOREST COVER TYPES

CLASSIFIED ON BASIS OF SIZE OF STAND

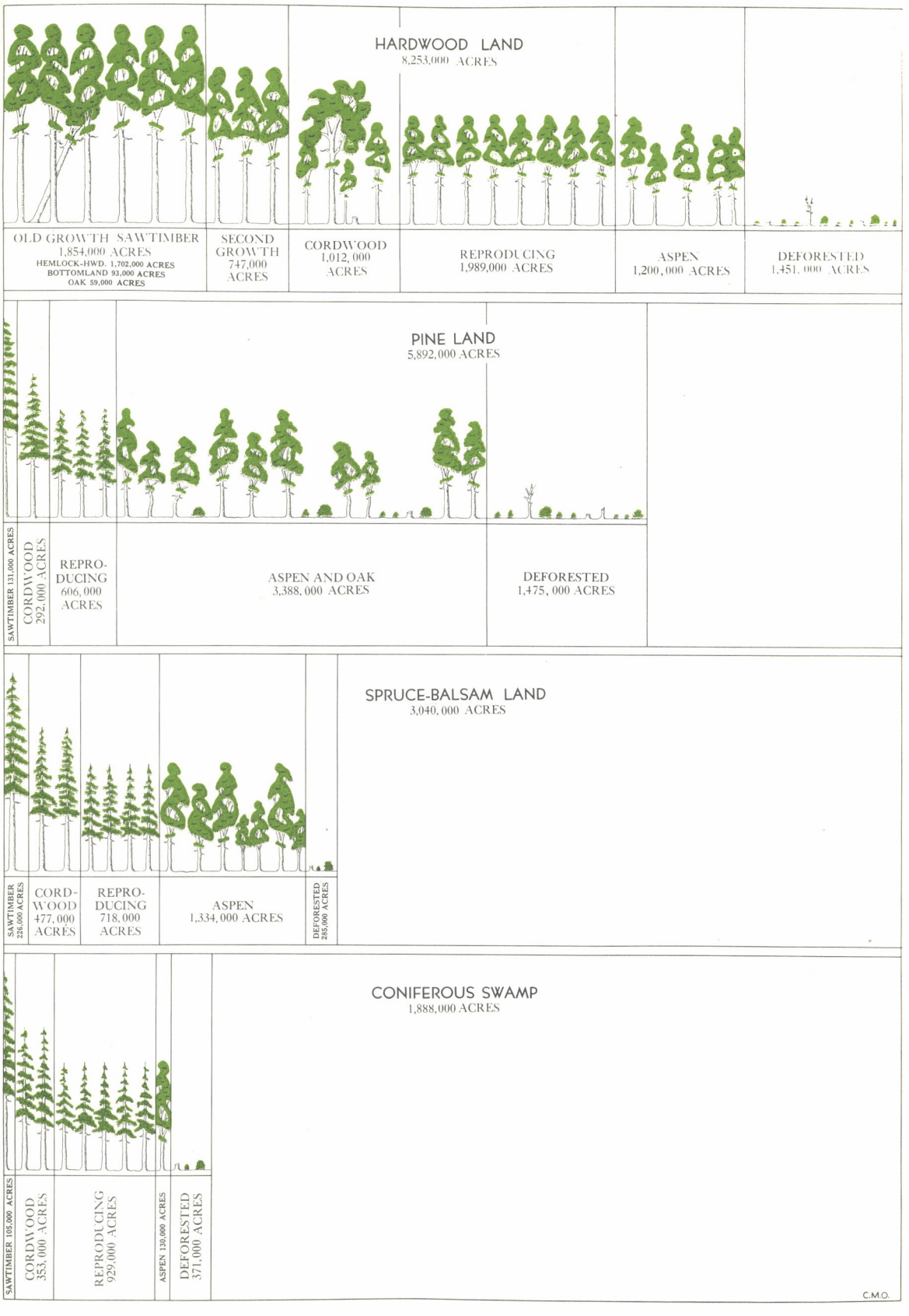
ENTIRE STATE OF MICHIGAN
1935
Areas in Acres

Forest Cover Type	All Size Classes	Old Growth Sawtimber	Second Growth Sawtimber	Cord-wood	Restocking Areas
PINE					
Jack Pine	775,000		17,000	209,000	549,000
Norway Pine	83,000	6,000	17,000	31,000	29,000
White Pine	171,000	51,000	40,000	52,000	28,000
TOTAL	1,029,000	57,000	74,000	292,000	606,000
HARDWOOD					
Hemlock-Hardwood	4,576,000	1,702,000	557,000	609,000	1,708,000
Oak	1,350,000	61,000	85,000	382,000	822,000
Aspen	5,045,000	17,000	67,000	1,007,000	3,954,000
Bottomland	683,000	93,000	107,000	284,000	199,000
TOTAL	11,654,000	1,873,000	816,000	2,282,000	6,683,000
SPRUCE-BALSAM	1,421,000	49,000	177,000	477,000	718,000
CONIFEROUS SWAMP					
Spruce	478,000	3,000	26,000	142,000	307,000
Tamarack	247,000		6,000	59,000	182,000
Cedar	639,000	16,000	54,000	152,000	417,000
Non-productive	23,000				23,000
TOTAL	1,387,000	19,000	86,000	353,000	929,000
TOTAL FORESTED	15,491,000	1,998,000	1,153,000	3,404,000	8,936,000
TOTAL DE-FORESTED	3,582,000				
ALL COVER TYPES	19,073,000				

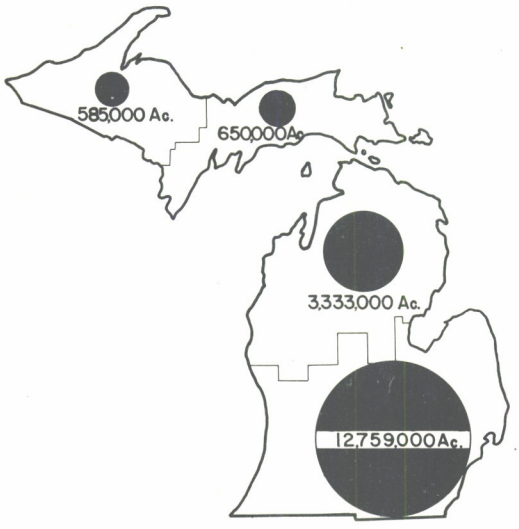
Percentage distribution of size classes is shown in Table 3.
Comparable acreages for the four economic units are presented in Tables 5, 6, 7 and 8.

CHARACTER OF FOREST COVER

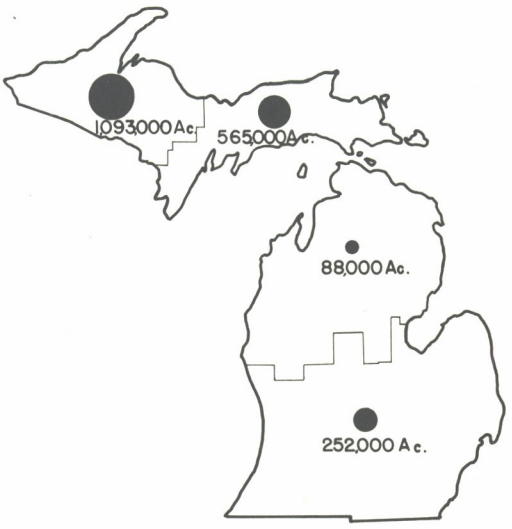
ON SEVERAL TYPES OF FOREST LAND



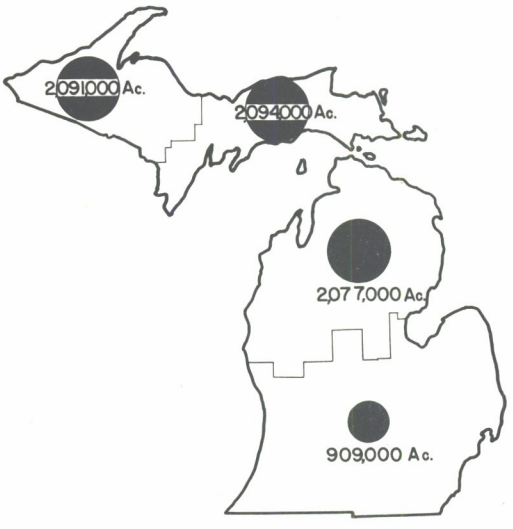
COMPARATIVE ACREAGE OF SELECTED CLASSES OF LAND BY ECONOMIC UNITS



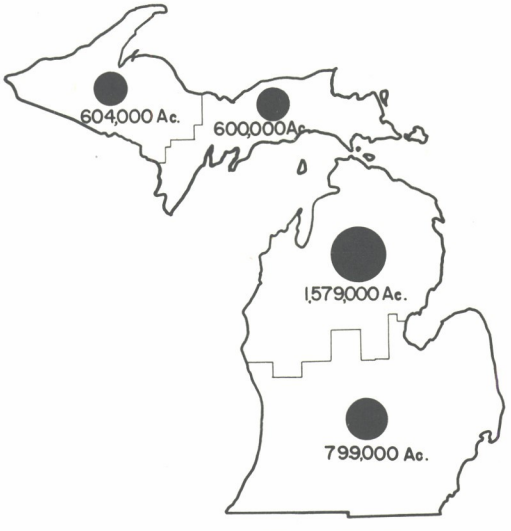
NON-FOREST



OLD GROWTH SAWTIMBER



VALUABLE YOUNG GROWTH



DEFORESTED

TABLE 3

CLASSIFICATION OF PRESENT COVER TYPE AREAS

ON BASIS OF SIZE OF TIMBER

ENTIRE STATE OF MICHIGAN

1935

Cover Type	Thousand Acres	PERCENTAGE DISTRIBUTION					
		All Size Classes	Old Growth Sawtimber	Second Growth Sawtimber	Cord-wood	Repro-duction	Defor-ested
Pines	1,029	100.0	5.5	7.2	28.4	58.9	
Hemlock-Hardwood	4,576	100.0	37.2	12.2	13.3	37.3	
Bottomland Hardwood	683	100.0	13.6	15.7	41.6	29.1	
Spruce-Balsam	1,421	100.0	3.4	12.5	33.6	50.5	
Coniferous Swamp	1,387	100.0	1.4	6.2	25.4	67.0	
Aspen	5,045	100.0	.3	1.3	20.0	78.4	
Oak	1,350	100.0	4.5	6.3	28.3	60.9	
Deforested	3,582	100.0					100.0
TOTAL	19,073	100.0	10.5	6.0	17.8	46.9	18.8

TABLE 4

ACREAGE OF FOREST COVER TYPES

BY ECONOMIC UNITS

Michigan 1935

Areas in Acres

Forest Cover Type	Entire State	UPPER PENINSULA West Half	UPPER PENINSULA East Half	LOWER PENINSULA North Half	LOWER PENINSULA South Half
PINE					
Jack Pine	775,000	43,000	190,000	530,000	12,000
Norway Pine	83,000	13,000	37,000	33,000	
White Pine	171,000	75,000	45,000	40,000	11,000
TOTAL	1,029,000	131,000	272,000	603,000	23,000
HARDWOOD					
Hemlock-Hardwood	4,576,000	2,101,000	1,121,000	987,000	367,000
Oak	1,350,000	4,000	18,000	872,000	456,000
Aspen	5,045,000	1,084,000	998,000	2,644,000	319,000
Bottomland	683,000	113,000	87,000	187,000	296,000
TOTAL	11,654,000	3,302,000	2,224,000	4,690,000	1,438,000
SPRUCE-BALSAM	1,421,000	512,000	623,000	285,000	1,000
CONIFEROUS SWAMP					
Spruce	478,000	227,000	202,000	48,000	1,000
Tamarack	247,000	43,000	130,000	53,000	21,000
Cedar	639,000	153,000	293,000	180,000	13,000
Non-productive	23,000	14,000	6,000	3,000	
TOTAL	1,387,000	437,000	631,000	284,000	35,000
TOTAL FORESTED	15,491,000	4,382,000	3,750,000	5,862,000	1,497,000
TOTAL DE-FORESTED	3,582,000	604,000	600,000	1,579,000	799,000
ALL COVER TYPES	19,073,000	4,986,000	4,350,000	7,441,000	2,296,000

The above areas are broken down by size class of timber in Tables 5, 6, 7 and 8. They are summarized here to facilitate comparison between districts.

TABLE 5

ACREAGE OF FOREST COVER TYPES

CLASSIFIED ON BASIS OF SIZE OF STAND

IN THE

WEST HALF OF THE UPPER PENINSULA

Michigan 1935

Areas in Acres

Forest Cover Type	All Size Classes	Old Growth Sawtimber	Second Growth Sawtimber	Cord-wood	Restocking Areas
PINE					
Jack Pine	43,000		2,000	13,000	28,000
Norway Pine	13,000	1,000	6,000	4,000	2,000
White Pine	75,000	28,000	22,000	18,000	7,000
TOTAL	131,000	29,000	30,000	35,000	37,000
HARDWOOD					
Hemlock-Hardwood	2,101,000	1,006,000	258,000	218,000	619,000
Oak	4,000			1,000	3,000
Aspen	1,084,000	3,000	19,000	289,000	773,000
Bottomland	113,000	14,000	29,000	37,000	33,000
TOTAL	3,302,000	1,023,000	306,000	545,000	1,428,000
SPRUCE-BALSAM	512,000	33,000	112,000	162,000	205,000
CONIFEROUS SWAMP					
Spruce	227,000	2,000	18,000	72,000	135,000
Tamarack	43,000		1,000	7,000	35,000
Cedar	153,000	6,000	36,000	31,000	80,000
Non-productive	14,000				14,000
TOTAL	437,000	8,000	55,000	110,000	264,000
TOTAL FORESTED	4,382,000	1,093,000	503,000	852,000	1,934,000
TOTAL DE-FORESTED	604,000				
ALL FOREST LANDS	4,986,000				

TABLE 6

ACREAGE OF FOREST COVER TYPES

CLASSIFIED ON BASIS OF SIZE OF STAND

IN THE

EAST HALF OF THE UPPER PENINSULA

Michigan 1935

Areas in Acres

Forest Cover Type	All Size Classes	Old Growth Sawtimber	Second Growth Sawtimber	Cord-wood	Restocking Areas
PINE					
Jack Pine	190,000			48,000	142,000
Norway Pine	37,000	2,000	5,000	20,000	10,000
White Pine	45,000	15,000	6,000	14,000	10,000
TOTAL	272,000	17,000	11,000	82,000	162,000
HARDWOOD					
Hemlock-Hardwood	1,121,000	504,000	110,000	96,000	411,000
Oak	18,000			1,000	17,000
Aspen	998,000	9,000	35,000	234,000	720,000
Bottomland	87,000	9,000	10,000	31,000	37,000
TOTAL	2,224,000	522,000	155,000	362,000	1,185,000
SPRUCE-BALSAM	623,000	15,000	55,000	242,000	311,000
CONIFEROUS SWAMP					
Spruce	202,000	1,000	8,000	60,000	133,000
Tamarack	130,000		5,000	39,000	86,000
Cedar	293,000	10,000	17,000	90,000	176,000
Non-productive	6,000				6,000
TOTAL	631,000	11,000	30,000	189,000	401,000
TOTAL FORESTED	3,750,000	565,000	251,000	875,000	2,059,000
TOTAL DE-FORESTED	600,000				
ALL FOREST LANDS	4,350,000				

TABLE 7

ACREAGE OF FOREST COVER TYPES

CLASSIFIED ON BASIS OF SIZE OF STAND

IN THE

NORTH HALF OF THE LOWER PENINSULA

Michigan 1935

Areas in Acres

Forest Cover Type	All Size Classes	Old Growth Sawtimber	Second Growth Sawtimber	Cord-wood	Restocking Areas
PINE					
Jack Pine	530,000		15,000	144,000	371,000
Norway Pine	33,000	3,000	6,000	7,000	17,000
White Pine	40,000	7,000	8,000	15,000	10,000
TOTAL	603,000	10,000	29,000	166,000	398,000
HARDWOOD					
Hemlock-Hardwood	987,000	68,000	95,000	209,000	615,000
Oak	872,000	1,000	2,000	229,000	640,000
Aspen	2,644,000	1,000	10,000	440,000	2,193,000
Bottomland	187,000	7,000	15,000	95,000	70,000
TOTAL	4,690,000	77,000	122,000	973,000	3,518,000
SPRUCE-BALSAM	285,000	1,000	10,000	73,000	201,000
CONIFEROUS SWAMP					
Spruce	48,000			10,000	38,000
Tamarack	53,000			5,000	48,000
Cedar	180,000		1,000	29,000	150,000
Non-productive	3,000				3,000
TOTAL	284,000		1,000	44,000	239,000
TOTAL FORESTED	5,862,000	88,000	162,000	1,256,000	4,356,000
TOTAL DE-FORESTED	1,579,000				
ALL FOREST LANDS	7,441,000				

TABLE 8

ACREAGE OF FOREST COVER TYPES

CLASSIFIED ON BASIS OF SIZE OF STAND

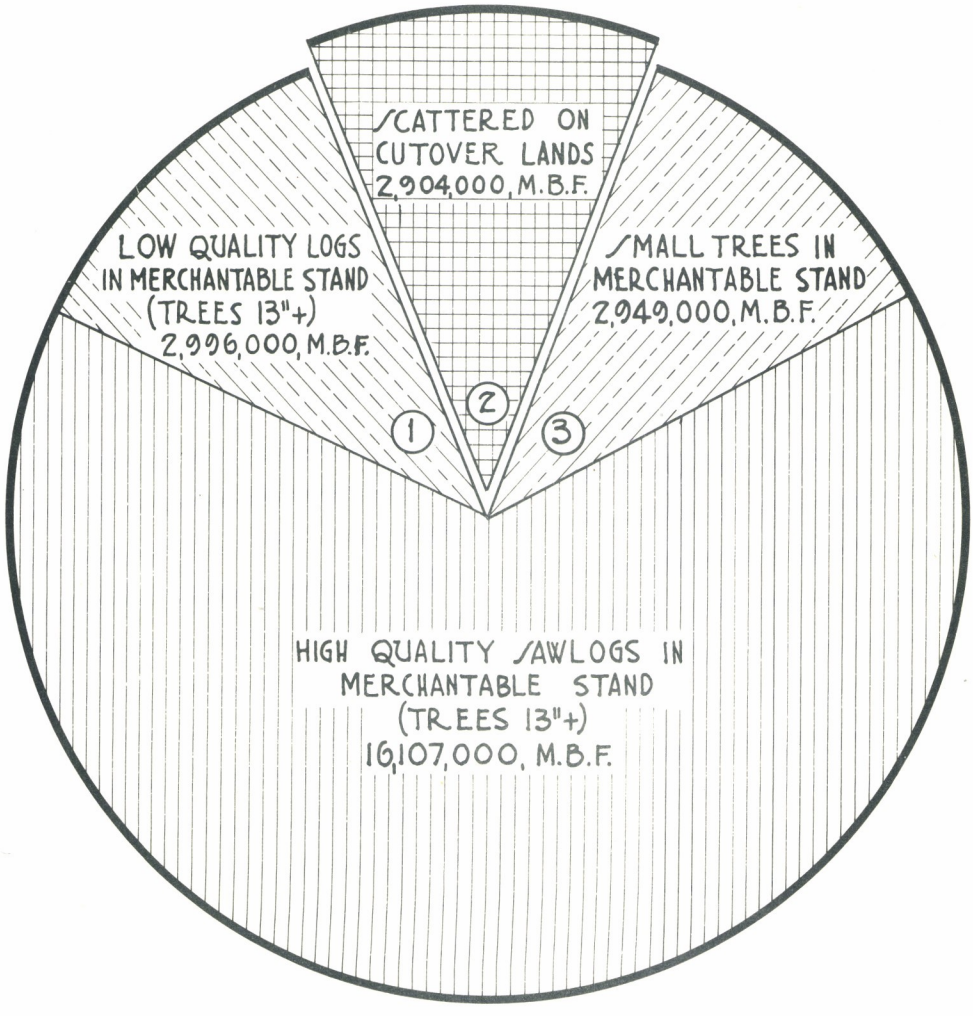
IN THE

SOUTH HALF OF THE LOWER PENINSULA
Michigan
1935
Areas in Acres

Forest Cover Type	All Size Classes	Old Growth Sawtimber	Second Growth Sawtimber	Cord-wood	Restocking Areas
PINE					
Jack Pine	12,000			4,000	8,000
Norway Pine					
White Pine	11,000	1,000	4,000	5,000	1,000
TOTAL	23,000	1,000	4,000	9,000	9,000
HARDWOOD					
Hemlock-Hardwood	367,000	124,000	94,000	86,000	63,000
Oak	456,000	60,000	83,000	151,000	162,000
Aspen	319,000	4,000	3,000	44,000	268,000
Bottomland	296,000	63,000	53,000	121,000	59,000
TOTAL	1,438,000	251,000	233,000	402,000	552,000
SPRUCE-BALSAM	1,000				1,000
CONIFEROUS SWAMP					
Spruce	1,000				1,000
Tamarack	21,000			8,000	13,000
Cedar	13,000			2,000	11,000
Non-productive					
TOTAL	35,000			10,000	25,000
TOTAL FORESTED	1,497,000	252,000	237,000	421,000	587,000
TOTAL DE-FORESTED	799,000				
ALL FOREST LANDS	2,296,000				

TOTAL SAWTIMBER VOLUME

BY SIZE, QUALITY, AND AVAILABILITY


SCATTERED ON CUTOVER LANDS 2,904,000, M.B.F.
LOW QUALITY LOGS IN MERCHANTABLE STAND (TREES 13"+) 2,996,000, M.B.F.
SMALL TREES IN MERCHANTABLE STAND 2,949,000, M.B.F.
1
2
3
HIGH QUALITY SAWLOGS IN MERCHANTABLE STAND (TREES 13"+) 16,107,000, M.B.F.

TOTAL SAWTIMBER STAND 24,956,000, M.B.F.
NET VOLUME - SCRIBNER LOG RULE

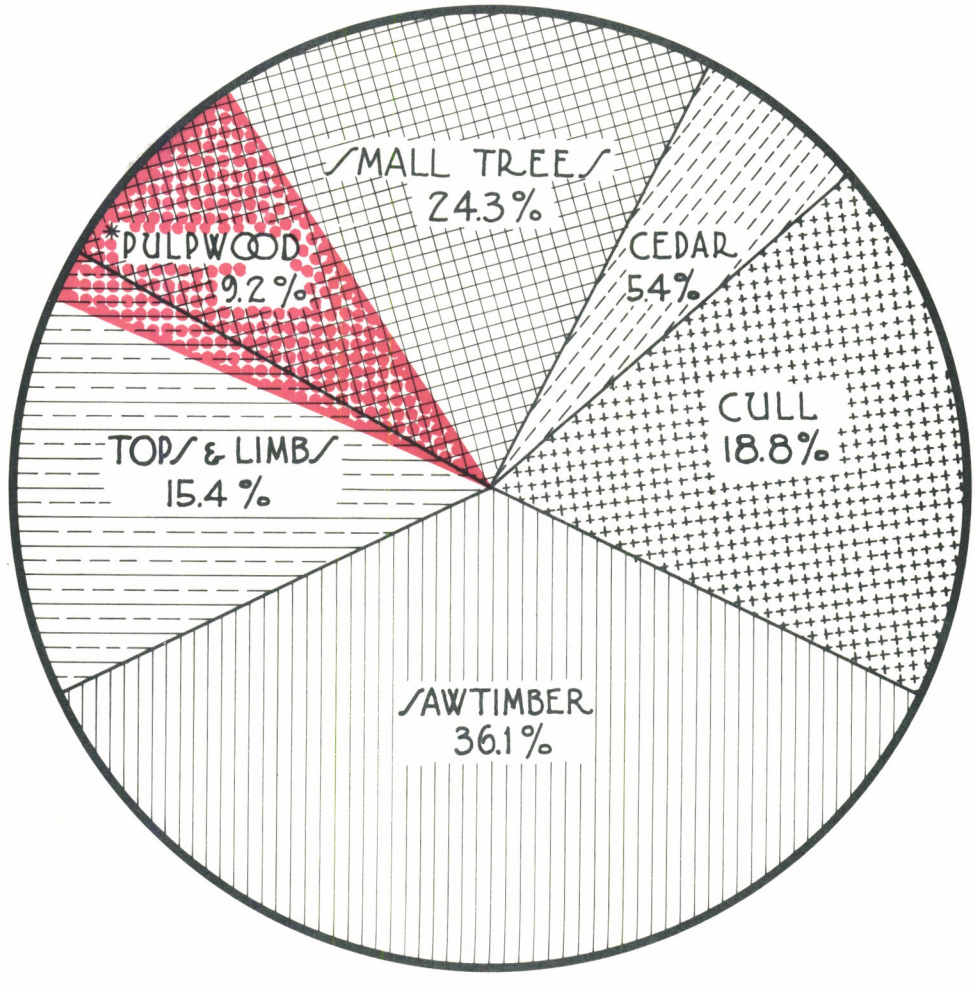
(1) LOW QUALITY SAWLOGS ARE SUITABLE ONLY FOR BOX BOARDS AND LOW GRADE LUMBER.

(2) STANDS WITH LESS THAN 2000 B.F. PER ACRE IN THE MAIN FOREST DISTRICTS ORDINARILY ARE CONSIDERED TOO SPARSE FOR COMMERCIAL LOGGING.

(3) MOST LARGE OPERATORS IN MICHIGAN DO NOT CUT TREES LESS THAN 14 INCHES IN DIAMETER.

DISTRIBUTION OF TOTAL TIMBER VOLUME

BY CLASSES OF PRODUCTS



TOTAL VOLUME-12,568,000,000 CUBIC FEET

* PULPWOOD INCLUDES ONLY MATERIAL UNSUITABLE FOR SAWTIMBER.

TABLE 9

SUMMARY OF TIMBER VOLUME

BY ECONOMIC UNITS

Michigan
1935

Product	Unit of Measure	Entire State	UPPER PENINSULA West Half	UPPER PENINSULA East Half	LOWER PENINSULA North Half	LOWER PENINSULA South Half
Sawtimber	M.B.F.	24,956,000	13,672,000	6,736,000	1,966,000	2,582,000
Pulpwood *1*	Cords	15,117,000	5,472,000	5,315,000	3,980,000	350,000
Poles (Cedar)	Pieces	22,924,000	11,259,000	9,662,000	1,940,000	63,000
Posts (Round Cedar)	Pieces	92,162,000	11,079,000	59,646,000	21,169,000	268,000
Posts (Split Cedar)	Pieces	56,817,000	17,629,000	33,647,000	5,487,000	54,000
Cordwood						
Small Trees *2*	Cords	42,324,000	13,946,000	11,042,000	12,279,000	5,057,000
Tops and Limbs *2*	Cords	34,751,000	17,433,000	8,267,000	3,984,000	5,067,000
Cull *3*	Cords	35,684,000	17,967,000	10,130,000	4,329,000	3,258,000
TOTAL VOLUME	M Cu. Ft.	12,568,000	5,876,000	3,473,000	1,867,000	1,352,000

1 Pulpwood species are spruce, balsam fir, tamarack, jack pine, aspen and hemlock. The pulpwood volume includes only wood unsuitable for sawtimber.

2 Cordwood in small trees and tops and limbs includes the pulpwood volume shown opposite "Pulpwood". Tops and limbs include all cedar volume not usable as posts or poles.

3 Cull volume includes cull trees as well as cull in merchantable trees.

TABLE 10

TOTAL VOLUME OF SAWTIMBER BY SPECIES

SCALED BY

SCRIBNER AND INTERNATIONAL (¼" kerf) LOG RULES

ENTIRE STATE OF MICHIGAN
1935

Species	Scribner Rule	International (¼" kerf) Rule
	Thousands of Board Feet	
White Pine	881,000	1,010,000
Norway Pine	150,000	187,000
Jack Pine	135,000	169,000
Hemlock	5,801,000	6,550,000
White Spruce	518,000	624,000
Black Spruce	295,000	360,000
Balsam Fir	499,000	606,000
Tamarack	62,000	78,000
Sugar Maple	6,557,000	7,423,000
Yellow Birch	3,326,000	3,771,000
Beech	1,169,000	1,326,000
Elm	1,093,000	1,248,000
Oaks	1,056,000	1,211,000
Soft Maple	1,054,000	1,197,000
Poplars	772,000	955,000
Basswood	669,000	760,000
Misc. Inferior Hdwds.	369,000	422,000
Paper Birch	281,000	345,000
Misc. Better Hdwds.	269,000	307,000
ALL SPECIES	24,956,000	28,549,000

TABLE 11

VOLUME OF SAWTIMBER

BY QUALITY OF LOGS AND SIZE OF TREES

Entire State of Michigan

1935

Species	Total All Log Grades	High Quality Logs [1]	Low Quality Logs [1]
	MILLION BOARD FEET		
	In Trees 10 Inches D.B.H. and Larger [2]		
White Pine	881	881	
Norway Pine	150	150	
Jack Pine	135	135	
Spruce	813	813	
Balsam	499	499	
Tamarack	62	62	
Hemlock	5,801	5,801	
Poplars [3]	772	382	390
Elm	1,093	922	171
Paper Birch	281	199	82
Basswood	669	554	115
Oaks	1,056	735	321
Sugar Maple	6,557	5,139	1,418
Yellow Birch	3,326	2,586	740
Beech [4]	1,169	870	299
Misc. Hardwoods	1,692	1,155	537
ALL SPECIES	24,956	20,883	4,073
	In Trees 14 Inches D.B.H. and Larger [2]		
White Pine	738	738	
Norway Pine	100	100	
Jack Pine	28	28	
Spruce	415	415	
Balsam	111	111	
Tamarack	18	18	
Hemlock	5,334	5,334	
Poplars [3]	259	148	111
Elm	941	790	151
Paper Birch	141	99	42
Basswood	574	474	100
Oaks	820	568	252
Sugar Maple	5,796	4,545	1,251
Yellow Birch	3,006	2,337	669
Beech [4]	888	659	229
Misc. Hardwoods	1,265	865	400
ALL SPECIES	20,434	17,229	3,205

1/ Specifications for log grades are described on page 6. Low quality logs of jack pine, spruce, balsam fir, tamarack, and hemlock were estimated as pulpwood, in cords, and are not included in the sawtimber estimate. All sawtimber of white and Norway pine is rated as high quality because of close current utilization.

2/ Diameter of trees was measured at breast height (D.B.H.), or 4½ feet above the ground.

3/ Poplars include aspen, cottonwood, and balm o'gilead.

4/ Miscellaneous hardwoods include principally black ash, red maple, and ironwood.

SAWTIMBER VOLUME BY SPECIES AND CONDITION OF STAND

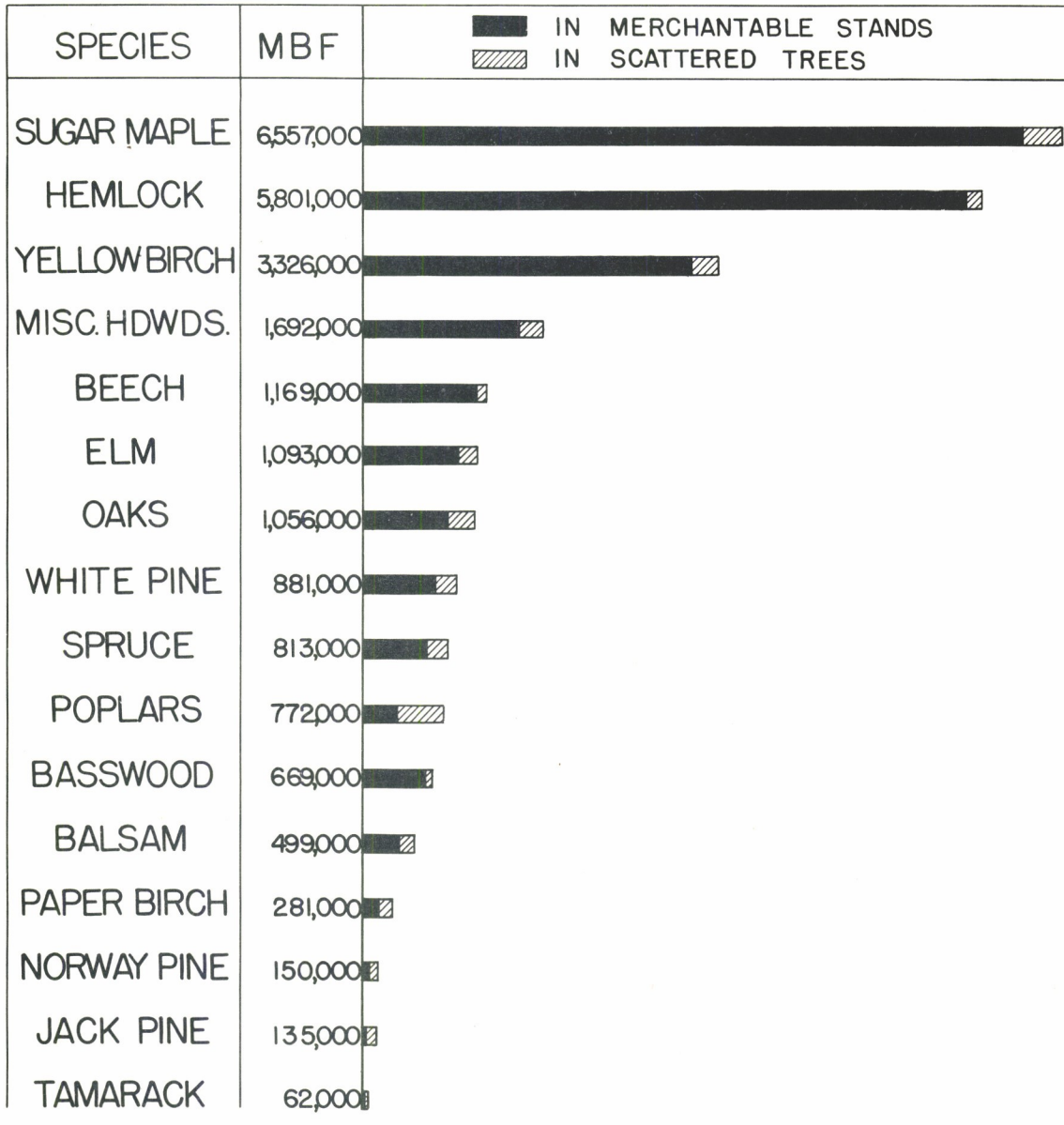


TABLE 12

VOLUME OF SAWTIMBER

BY SPECIES AND SIZE CLASS OF STAND

ENTIRE STATE OF MICHIGAN

1935

In Millions of Board Feet

Species	All Size Classes	Old Growth Sawtimber	Second Growth Sawtimber	Cord-wood	Restocking & Deforested Areas
White Pine	881	460	232	123	66
Norway Pine	150	17	35	38	60
Jack Pine	135	2	35	60	38
Spruce	813	256	356	164	37
Balsam Fir	499	160	194	111	34
Tamarack	62	3	16	32	11
Hemlock	5,801	5,341	315	68	77
TOTAL SOFTWOOD	8,341	6,239	1,183	596	323
Sugar Maple	6,557	5,593	593	122	249
Yellow Birch	3,326	2,663	409	105	149
Basswood	669	495	107	37	30
Elm	1,093	681	230	102	80
Oaks	1,056	454	365	144	93
Beech	1,169	882	201	41	45
Paper Birch	281	44	110	85	42
Poplars *1*	772	86	248	352	86
Misc. Hardwoods *2*	1,692	1,003	466	131	92
TOTAL HARDWOOD	16,615	11,901	2,729	1,119	866
ALL SPECIES	24,956	18,140	3,912	1,715	1,189

1 Poplars include aspen, cottonwood and balm-of-Gilead.
2 Miscellaneous Hardwoods include principally black ash, soft maple and ironwood.
Comparable figures for each economic unit are presented in Tables 14, 15, 16 and 17.

TABLE 13

VOLUME OF SAWTIMBER

BY SPECIES AND ECONOMIC UNITS

Michigan
1935

In Millions of Board Feet

Species	Entire State	UPPER PENINSULA		LOWER PENINSULA	
		West Half	East Half	North Half	South Half
White Pine	881	479	234	128	40
Norway Pine	150	30	37	82	1
Jack Pine	135	22	23	90	
Spruce	813	575	219	19	
Balsam Fir	499	247	223	29	
Tamarack	62	15	31	12	4
Hemlock	5,801	4,282	1,353	163	3
TOTAL SOFTWOOD	8,341	5,650	2,120	523	48
Sugar Maple	6,557	4,127	1,823	374	233
Yellow Birch	3,326	2,363	922	37	4
Basswood	669	340	58	96	175
Elm	1,093	253	132	208	500
Oaks	1,056	50	3	139	864
Beech	1,169	15	839	226	89
Paper Birch	281	73	163	43	2
Poplars /1	772	134	312	227	99
Misc. Hardwood /2	1,692	667	364	93	568
TOTAL HARDWOOD	16,615	8,022	4,616	1,443	2,534
ALL SPECIES	24,956	13,672	6,736	1,966	2,582

/1 Poplars include aspen, cottonwood and balm-of-Gilead.
/2 Miscellaneous Hardwoods are principally black ash, soft maple and ironwood.

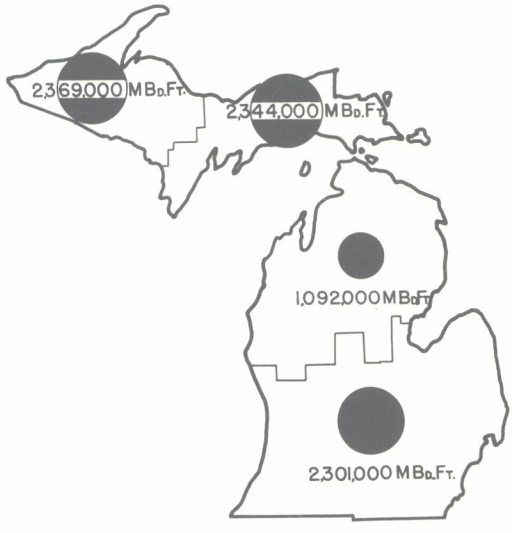
DISTRIBUTION OF SAWTIMBER VOLUME

BY SPECIES AND ECONOMIC UNITS

PINE

HEMLOCK

SUGAR MAPLE AND
YELLOW BIRCH



OTHER

TABLE 14

VOLUME OF SAWTIMBER

BY SPECIES AND SIZE CLASS OF STAND

WEST HALF UPPER PENINSULA

Michigan
1935

In Millions of Board Feet

Species	All Size Classes	Old Growth Sawtimber	Second Growth Sawtimber	Cord-wood	Restocking & Deforested Areas
White Pine	479	284	140	39	16
Norway Pine	30	3	13	8	6
Jack Pine	22		6	12	4
Spruce	575	185	276	95	19
Balsam Fir	247	89	105	42	11
Tamarack	15		3	9	3
Hemlock	4,282	4,040	177	28	37
TOTAL SOFTWOOD	5,650	4,601	720	233	96
Sugar Maple	4,127	3,531	376	65	155
Yellow Birch	2,363	1,912	285	65	101
Basswood	340	307	13	7	13
Elm	253	215	25	5	8
Oaks	50	15	13	16	6
Beech	15	15			
Paper Birch	73	8	37	18	10
Poplars	134	9	50	60	15
Misc. Hdwds. /	667	411	194	30	32
TOTAL HARDWOOD	8,022	6,423	993	266	340
ALL SPECIES	13,672	11,024	1,713	499	436

/ Miscellaneous Hardwoods include principally black ash, soft maple and ironwood.

TABLE 15

VOLUME OF SAWTIMBER

BY SPECIES AND SIZE CLASS OF STAND

EAST HALF UPPER PENINSULA

Michigan
1935

In Millions of Board Feet

Species	All Size Classes	Old Growth Sawtimber	Second Growth Sawtimber	Cord-wood	Restocking & Deforested Areas
White Pine	234	128	44	47	15
Norway Pine	37	5	7	15	10
Jack Pine	23	1		14	8
Spruce	219	70	78	58	13
Balsam Fir	223	70	80	54	19
Tamarack	31		10	15	6
Hemlock	1,353	1,205	99	24	25
TOTAL SOFTWOOD	2,120	1,479	318	227	96
Sugar Maple	1,823	1,654	91	17	61
Yellow Birch	922	735	115	29	43
Basswood	58	47	4	2	5
Elm	132	103	15	6	8
Oaks	3	1		1	1
Beech	839	717	95	10	17
Paper Birch	163	31	48	56	28
Poplars /1	312	36	128	130	18
Misc. Hardwoods /2	364	258	65	21	20
TOTAL HARDWOOD	4,616	3,582	561	272	201
ALL SPECIES	6,736	5,061	879	499	297

/1 Poplars include aspen, cottonwood and balm-of-Gilead.
/2 Miscellaneous Hardwoods include principally black ash, soft maple and ironwood.

TABLE 16

VOLUME OF SAWTIMBER

BY SPECIES AND SIZE CLASS OF STAND

NORTH HALF LOWER PENINSULA

Michigan
1935

In Millions of Board Feet

Species	All Size Classes	Old Growth Sawtimber	Second Growth Sawtimber	Cord-wood	Restocking & Deforested Areas
White Pine	128	42	24	31	31
Norway Pine	82	9	15	15	43
Jack Pine	90	1	29	34	26
Spruce	19	1	2	11	5
Balsam Fir	29	1	9	15	4
Tamarack	12	3	3	4	2
Hemlock	163	96	37	15	15
TOTAL SOFTWOOD	523	153	119	125	126
Sugar Maple	374	234	79	36	25
Yellow Birch	37	14	9	10	4
Basswood	96	30	41	19	6
Elm	208	59	61	61	27
Oaks	139	9	14	62	54
Beech	226	91	85	26	24
Paper Birch	43	5	23	11	4
Poplars	227	5	44	135	43
Misc. Hdwds. /	93	26	26	31	10
TOTAL HARDWOOD	1,443	473	382	391	197
ALL SPECIES	1,966	626	501	516	323

/ Miscellaneous Hardwoods include principally black ash, soft maple and ironwood.

TABLE 17

VOLUME OF SAWTIMBER

BY SPECIES AND SIZE CLASS OF STAND

SOUTH HALF LOWER PENINSULA

Michigan
1935

In Millions of Board Feet

Species	All Size Classes	Old Growth Sawtimber	Second Growth Sawtimber	Cord-wood	Restocking & Deforested Areas
White Pine	40	6	24	6	4
Norway Pine	1				1
Jack Pine					
Spruce					
Balsam Fir					
Tamarack	4			4	
Hemlock	3		2	1	
TOTAL SOFTWOOD	48	6	26	11	5
Sugar Maple	233	174	47	4	8
Yellow Birch	4	2		1	1
Basswood	175	111	49	9	6
Elm	500	304	129	30	37
Oaks	864	429	338	65	32
Beech	89	59	21	5	4
Paper Birch	2		2		
Poplars *1*	99	36	26	27	10
Misc. Hardwoods *2*	568	308	181	49	30
TOTAL HARDWOOD	2,534	1,423	793	190	128
ALL SPECIES	2,582	1,429	819	201	133

1 Poplars include aspen, cottonwood and balm-of-Gilead.
2 Miscellaneous Hardwoods include principally black ash, soft maple and ironwood.

TABLE 18

VOLUME OF PULPWOOD

BY SPECIES AND ECONOMIC UNITS

Michigan
1935

Thousand Cords

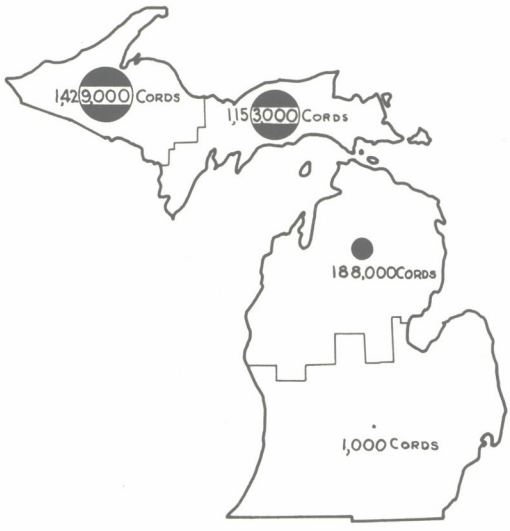
Species	Entire State	UPPER PENINSULA		LOWER PENINSULA	
		West Half	East Half	North Half	South Half
ALL PULPWOOD [1]					
Spruce	2,771	1,429	1,153	188	1
Balsam Fir	3,928	1,924	1,641	362	1
Jack Pine	1,235	74	293	854	14
Hemlock	2,438	1,396	841	198	3
Tamarack	508	64	295	87	62
Aspen	4,237	585	1,092	2,291	269
ALL SPECIES	15,117	5,472	5,315	3,980	350
IN SMALL TREES [2]					
Spruce	2,267	1,087	1,007	172	1
Balsam Fir	3,406	1,638	1,437	330	1
Jack Pine	1,099	61	269	756	13
Hemlock	1,192	670	388	131	3
Tamarack	432	53	247	76	56
Aspen	3,876	486	983	2,164	243
ALL SPECIES	12,272	3,995	4,331	3,629	317
IN TOPS OF SAWTIMBER TREES					
Spruce	504	342	146	16	
Balsam Fir	522	286	204	32	
Jack Pine	136	13	24	98	1
Hemlock	1,246	726	453	67	
Tamarack	76	11	48	11	6
Aspen	361	99	109	127	26
ALL SPECIES	2,845	1,477	984	351	33

[1] Material suitable for good quality sawlogs is not included in pulpwood estimates. The equivalent of about 1,965,000 cords of spruce and balsam fir occurs in 10-inch and 12-inch trees, estimated as sawtimber.

[2] Only volume of small trees which would yield at least two 8-foot sticks of pulpwood with a minimum 4-inch top (5 inches in aspen and hemlock) is included.

DISTRIBUTION OF PULPWOOD VOLUME

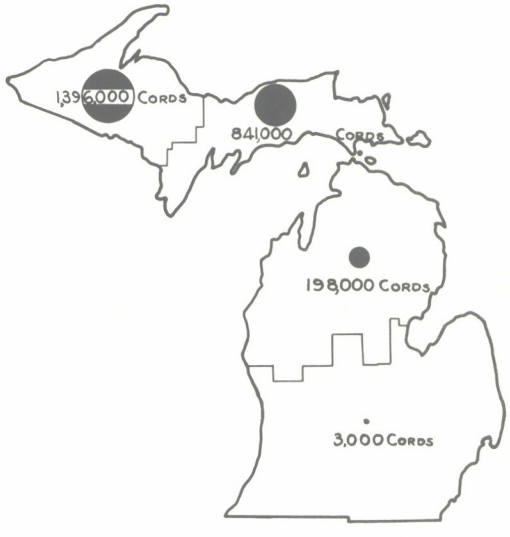
BY SPECIES AND ECONOMIC UNITS



SPRUCE

BALSAM FIR

JACK PINE



HEMLOCK

TABLE 19

VOLUME OF PULPWOOD /

BY SPECIES AND SIZE CLASS OF STAND

UPPER AND LOWER PENINSULAS OF MICHIGAN

1935

Species	All Size Classes	Sawtimber Stands	Cordwood Stands	Restocking & Deforested Areas
	Thousand Cords			
ENTIRE STATE				
Spruce	2,771	788	1,594	389
Balsam Fir	3,928	1,785	1,643	500
Jack Pine	1,235	108	809	318
Tamarack	508	39	345	124
Hemlock	2,438	2,022	227	189
Aspen	4,237	361	2,789	1,087
ALL SPECIES	15,117	5,103	7,407	2,607
UPPER PENINSULA				
Spruce	2,582	780	1,473	329
Balsam Fir	3,565	1,740	1,430	395
Jack Pine	367	20	277	70
Tamarack	359	33	257	69
Hemlock	2,237	1,927	161	149
Aspen	1,677	266	1,136	275
ALL SPECIES	10,787	4,766	4,734	1,287
LOWER PENINSULA				
Spruce	189	8	121	60
Balsam Fir	363	45	213	105
Jack Pine	868	88	532	248
Tamarack	149	6	88	55
Hemlock	201	95	66	40
Aspen	2,560	95	1,653	812
ALL SPECIES	4,330	337	2,673	1,320

/ Volume includes small trees as well as pulpwood from tops of sawtimber trees.

TABLE 20

TOTAL CUBIC VOLUME OF SOUND TREES /

BY SPECIES AND ECONOMIC UNITS

Michigan
1935
Gross Volume
Million Cubic Feet

Species	Entire State	UPPER PENINSULA		LOWER PENINSULA	
		West Half	East Half	North Half	South Half
White Pine	267	125	74	51	17
Norway Pine	70	9	24	37	
Jack Pine	149	12	34	102	1
Spruce	415	242	154	19	
Balsam Fir	465	228	200	37	
Tamarack	60	10	32	10	8
Cedar	691	297	313	77	4
Hemlock	1,731	1,242	422	66	1
TOTAL SOFTWOOD	3,848	2,165	1,253	399	31
Sugar Maple	2,348	1,481	596	177	94
Yellow Birch	1,186	846	312	22	6
Basswood	267	118	22	62	65
Elm	484	77	50	138	219
Oaks	636	23	4	221	388
Beech	417	6	282	87	42
Paper Birch	245	71	120	50	4
Poplars	867	186	237	379	65
Misc. Hardwood 2	984	364	212	112	296
TOTAL HARDWOOD	7,434	3,172	1,835	1,248	1,179
ALL SPECIES	11,282	5,337	3,088	1,647	1,210

/ Includes all sound trees 5 inches and larger in diameter at breast height. Excludes stump, bark and all wood in tops and limbs smaller than 4 inches inside bark.

2 Miscellaneous hardwoods include principally ash, soft maple and ironwood.

TABLE 21

AVERAGE VOLUME OF TIMBER PER ACRE

SELECTED FOREST COVER TYPES

BY ECONOMIC UNITS AND SIZE CLASS OF STAND

Michigan
1935

Forest Cover Type	Old Growth Sawtimber		Second Growth Sawtimber		Cordwood		Restocking Areas	
	Bd. Ft.	Cu. Ft.	Bd. FT.	Cu. Ft.	Bd. Ft.	Cu. Ft.	Bd. Ft.	Cu. Ft.
WEST HALF UPPER PENINSULA								
Jack Pine			2,600	1,329	777	646	30	56
Hemlock-Hdwd.	10,414	3,353	3,636	1,648	763	702	448	260
Spruce-Balsam	5,106	2,197	3,400	1,711	796	800	237	218
Aspen	6,891	2,667	2,656	1,499	278	512	51	40
Spruce Swamp	7,166	2,508	3,289	1,692	696	814	50	84
EAST HALF UPPER PENINSULA								
Jack Pine					309	537	41	41
Hemlock-Hdwd.	9,488	3,019	4,180	1,837	687	677	317	207
Spruce-Balsam	4,863	2,978	3,399	1,990	748	899	208	232
Aspen	5,813	2,192	3,554	1,599	553	760	53	54
Spruce-Swamp	2,926	1,757	2,364	1,340	285	650	31	71
NORTH HALF LOWER PENINSULA								
Jack Pine			2,107	1,161	255	435	82	91
Hemlock-Hdwd.	7,588	2,422	3,425	1,677	673	712	132	122
Spruce-Balsam	2,115	706	2,758	1,764	576	839	116	181
Aspen	7,596	2,976	3,132	1,595	306	583	34	60
Spruce-Swamp					278	692	22	56
SOUTH HALF LOWER PENINSULA								
Jack Pine					347	434	97	124
Hemlock-Hdwd.	5,910	1,964	3,248	1,500	566	646	217	153
Aspen	3,384	1,141	2,627	1,251	426	673	15	30
Spruce-Swamp							205	270

TABLE 22

AVERAGE NUMBER OF TREES AND

AVERAGE VOLUME PER ACRE

OLD GROWTH HEMLOCK - HARDWOOD STANDS

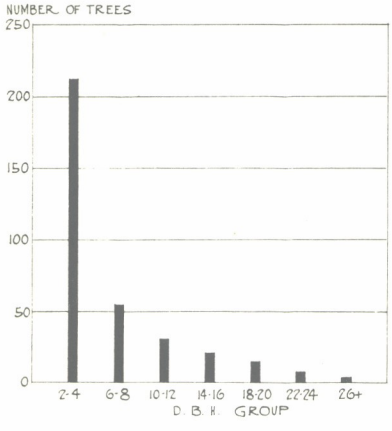
WEST HALF OF UPPER PENINSULA

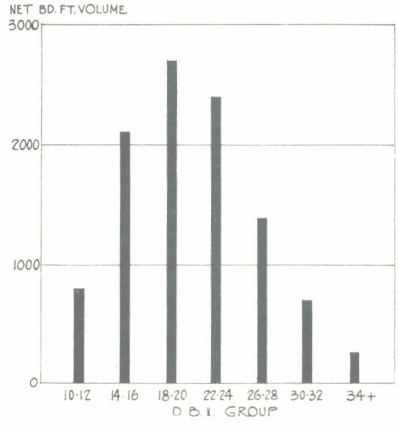
Michigan - 1935

DBH Group	SPECIES													
	Hemlock	White & Norway Pine	Other Conifers	Sugar Maple	Yellow Birch	Bass-wood	Elm	Beech	Oaks	Paper Birch	Aspen	Misc.* Hdwds.	All Species	Cull Trees
	NUMBER OF TREES													
2-4	23.18	.34	41.30	90.06	12.55	2.88	1.54	.55	.08	.47	.29	26.88	200.12	3.02
6-8	12.94	.07	12.05	15.56	5.63	1.08	.45	.13	.03	.26	.15	6.06	54.41	3.37
10-12	8.68	.05	4.52	10.98	4.49	.66	.25	.11	-	.04	.06	2.43	32.27	2.74
14-16	5.81	.01	1.40	9.20	3.82	.42	.21	.06	.06	.03	.01	1.46	22.49	1.87
18-20	4.13	.06	.42	5.72	2.74	.42	.11	.03	.03	-	.01	.54	14.21	1.44
22-24	2.73	.04	.06	2.30	1.53	.23	.11	-	-	-	-	.18	7.18	.89
26 +	1.90	.05	.01	.70	1.02	.12	.12	-	-	-	-	.07	3.99	.61
Total	59.37	0.62	59.76	134.52	31.78	5.81	2.79	.88	.20	.80	.52	37.62	334.67	13.94
	NET BOARD FOOT VOLUME													
10-12	229.5	1.8	78.8	306.4	106.4	15.7	6.0	3.2	-	.8	1.8	51.9	802.3	
14-16	555.0	1.7	53.4	960.8	343.2	47.3	24.7	5.6	6.8	2.4	.9	125.7	2127.5	
18-20	875.2	17.0	32.8	1132.8	500.8	96.1	24.7	6.4	6.0	-	1.6	85.3	2778.7	
22-24	1037.2	19.5	-	756.8	415.2	72.8	43.4	-	-	-	-	46.7	2391.6	
26 +	1266.1	46.0	-	333.6	485.6	69.8	80.7	-	-	-	-	32.1	2313.9	
Total	3963.0	86.0	165.0	3490.4	1851.2	301.7	179.5	15.2	12.8	3.2	4.3	341.7	10414.0	
	TOTAL CUBIC FEET**													
6-8	35.9	.2	39.7	70.7	23.7	4.6	1.7	.7	.1	.8	.6	23.7	202.4	8.0
10-12	99.8	.5	53.2	167.3	64.6	9.6	3.4	1.6	-	.6	.5	33.9	435.0	23.9
14-16	175.8	.4	35.3	303.3	119.0	14.8	7.1	1.9	2.1	.9	.3	45.3	706.2	37.7
18-20	242.9	3.8	18.2	321.0	148.6	27.2	6.8	1.8	1.7	-	.5	28.2	800.7	53.3
22-24	260.3	4.1	3.5	203.4	122.3	19.4	10.5	-	-	-	-	15.0	638.5	52.1
26 +	292.3	9.1	.8	88.4	134.2	17.9	18.1	-	-	-	-	9.4	570.2	61.0
Total	1107.0	18.1	150.7	1154.1	612.4	93.5	47.6	6.0	3.9	2.3	1.9	155.5	3353.0	236.0

* Miscellaneous hardwoods include all hardwood species not individually listed.
** Includes about 1½ cords of pulpwood, largely hemlock.

Comparison of Tables 22, 23, 24 and 25 indicates the variation in volume and composition of old growth hemlock hardwood stands in the several districts of the State.





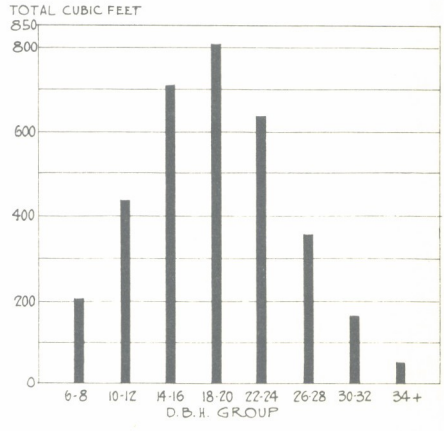


TABLE 23

AVERAGE NUMBER OF TREES AND

AVERAGE VOLUME PER ACRE

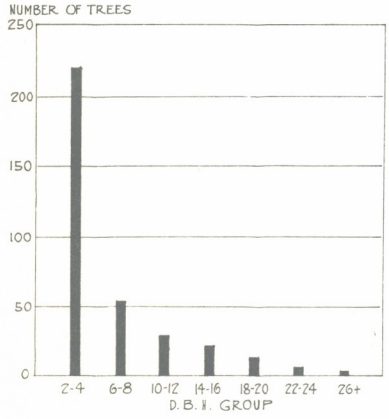
OLD GROWTH HEMLOCK - HARDWOOD STANDS

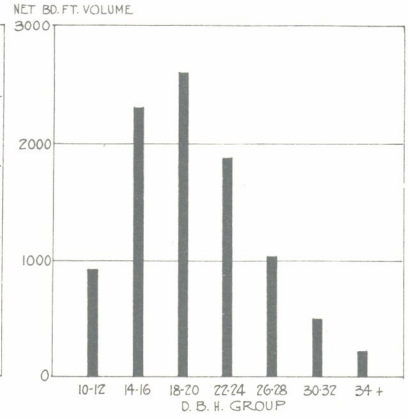
EAST HALF OF UPPER PENINSULA

Michigan - 1935

DBH Group	SPECIES													
	Hemlock	White & Norway Pine	Other Conifers	Sugar Maple	Yellow Birch	Bass-wood	Elm	Beech	Oaks	Paper Birch	Aspen	Misc.* Hdwds.	All Species	Cull Trees
	NUMBER OF TREES													
2-4	14.36	1.03	48.58	59.65	7.35	1.03	2.18	33.40	0.22	.87	-	52.06	220.73	5.61
6-8	6.43	.27	12.18	9.16	3.22	.26	.71	9.68	.02	.33	.10	7.93	50.29	4.45
10-12	4.73	.16	3.95	7.51	2.71	.12	.11	7.04	-	.22	.03	3.20	29.78	4.12
14-16	3.83	.08	1.03	7.13	3.05	.10	.06	4.61	-	.05	-	1.86	21.80	3.03
18-20	3.10	.04	.22	4.71	2.13	.07	.11	1.51	-	.03	-	.54	12.46	1.95
22-24	1.50	.03	.05	2.11	.91	.04	.06	.39	-	-	.01	.22	5.32	.81
26 +	1.07	.07	-	.83	.62	.06	.12	.05	-	.01	-	.08	2.91	.43
Total	35.02	1.68	66.01	91.10	19.99	1.68	3.35	56.68	0.24	1.51	0.14	65.89	343.29	20.40
	NET BOARD FOOT VOLUME													
10-12	128.0	5.1	96.4	229.6	83.3	4.5	2.8	289.3		6.6	1.5	82.6	929.7	
14-16	364.3	8.6	57.9	801.3	303.0	10.2	5.4	578.9		5.1	-	174.9	2309.6	
18-20	619.8	10.6	17.9	1016.3	401.6	16.1	22.7	369.6		5.7	-	98.4	2578.7	
22-24	541.2	14.3	8.7	763.3	285.5	15.5	21.6	152.6		-	2.9	72.8	1878.4	
26 +	693.6	80.0	-	464.1	325.3	39.7	100.8	31.2		8.8	-	43.1	1791.6	
Total	2351.9	118.6	180.9	3274.6	1398.7	86.0	153.3	1421.6		26.2	4.4	471.8	9488.0	
	TOTAL CUBIC FEET**													
6-8	17.9	.8	37.9	42.9	12.0	.9	2.3	41.3		1.5	.6	36.6	194.7	12.6
10-12	66.0	2.0	52.0	112.6	37.4	2.0	1.5	111.4		3.1	.5	45.1	433.6	48.9
14-16	123.8	2.5	30.1	249.9	98.5	3.5	1.9	167.1		1.6	-	61.0	739.9	80.3
18-20	180.1	2.5	11.6	287.0	121.0	4.7	6.7	98.5		1.7	-	30.7	744.5	92.2
22-24	136.7	3.0	4.2	199.8	80.3	4.1	5.7	38.6		-	.8	20.3	493.5	60.7
26 +	149.8	13.2	-	113.9	83.0	9.6	22.9	7.4		2.0	-	11.0	412.8	56.3
Total	674.3	24.0	135.8	1006.1	432.2	24.8	41.0	464.3		9.9	1.9	204.7	3019.0	351.0

* Miscellaneous hardwoods includes all hardwood species not individually listed.
** Includes about 1½ cords of hemlock pulpwood.





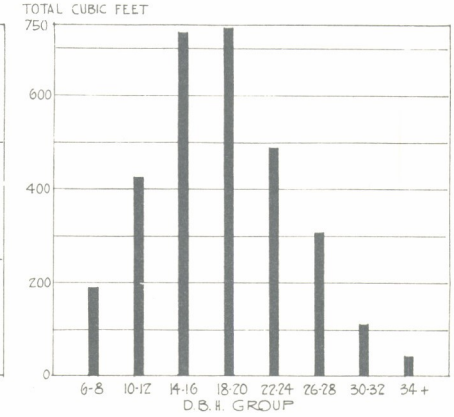


TABLE 24

AVERAGE NUMBER OF TREES AND

AVERAGE VOLUME PER ACRE

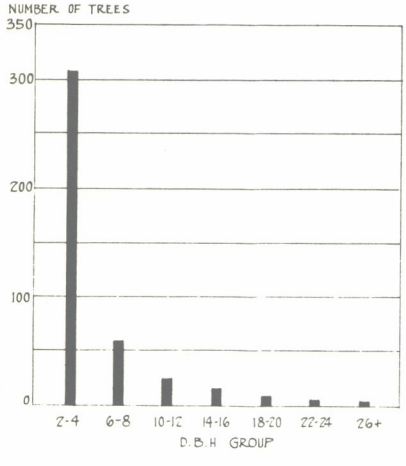
OLD GROWTH HEMLOCK - HARDWOOD STANDS

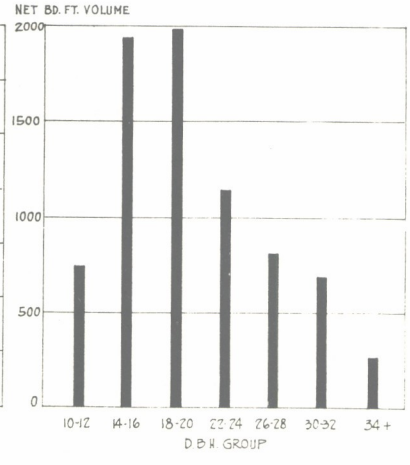
NORTH HALF OF LOWER PENINSULA

Michigan - 1935

DBH Group	SPECIES													
	Hemlock	White & Norway Pine	Other Conifers	Sugar Maple	Yellow Birch	Bass-Wood	Elm	Beech	Oaks	Paper Birch	Aspen	Misc.* Hdwds.	All Species	Cull Trees
	NUMBER OF TREES													
2-4	9.20	-	2.53	157.24	5.75	20.46	16.56	34.25	1.15	13.79	.46	46.21	307.60	4.37
6-8	5.06	.29	.46	15.69	1.26	6.79	7.30	8.80	.51	1.26	2.75	8.62	58.79	5.29
10-12	2.35	-	.06	5.57	.29	2.01	2.70	6.55	.18	.06	.80	3.44	24.01	3.56
14-16	2.87	.06	.12	5.53	.11	1.03	1.55	4.20	.12	-	.17	.91	16.67	1.72
18-20	1.67	.06	-	3.39	.22	.63	.80	1.33	.29	.06	-	.23	8.68	1.20
22-24	.57	-	-	1.67	.12	.17	.17	.17	-	-	-	.11	2.98	.40
26 +	.44	-	-	1.73	.18	.06	.06	.12	-	-	-	-	2.59	.52
Total	22.16	.41	3.17	190.82	7.93	31.15	29.14	55.42	2.25	15.17	4.18	59.52	421.32	17.06
	NET BOARD FOOT VOLUME													
10-12	65.4	-	1.6	161.2	6.2	56.3	62.7	269.3	2.9	1.1	32.8	89.9	749.4	
14-16	284.3	9.3	8.8	660.3	9.0	119.7	163.7	557.5	8.4	-	24.7	94.5	1940.2	
18-20	358.5	14.0	-	815.9	43.7	145.2	184.4	323.9	40.1	14.8	-	39.8	1980.3	
22-24	231.1	-	-	642.5	38.8	70.1	67.4	70.0	-	-	-	29.6	1149.5	
26 +	375.0	-	-	1146.9	94.7	34.9	34.2	82.9	-	-	-	-	1768.6	
Total	1314.3	23.3	10.4	3426.8	192.4	426.2	512.4	1303.6	51.4	15.9	57.5	253.8	7588.0	
	TOTAL CUBIC FEET**													
6-8	12.0	1.2	1.0	65.6	4.6	23.8	21.3	36.4	1.7	3.9	12.2	30.1	213.8	14.7
10-12	34.2	-	.7	82.0	3.5	30.6	40.4	107.0	2.4	.7	12.5	51.0	365.0	39.9
14-16	96.0	2.6	4.1	199.6	3.0	37.4	54.3	165.9	3.6	-	6.7	32.4	605.6	44.1
18-20	98.5	3.4	-	222.1	13.2	39.4	49.9	88.8	14.3	4.6	-	12.5	546.7	57.9
22-24	53.9	-	-	166.1	11.1	16.9	16.3	18.0	-	-	-	9.4	291.7	30.7
26 +	69.0	-	-	270.3	24.9	7.9	7.6	19.5	-	-	-	-	399.2	71.7
Total	363.6	7.2	5.8	1005.7	60.3	156.0	189.8	435.6	22.0	9.2	31.4	135.4	2422.0	259.0

* Miscellaneous hardwoods include all hardwood species not individually listed.
** Includes about 3/4 cord of hemlock pulpwood.





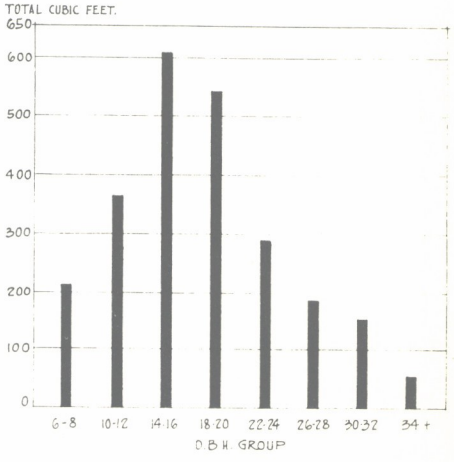


TABLE 25

AVERAGE NUMBER OF TREES AND

AVERAGE VOLUME PER ACRE

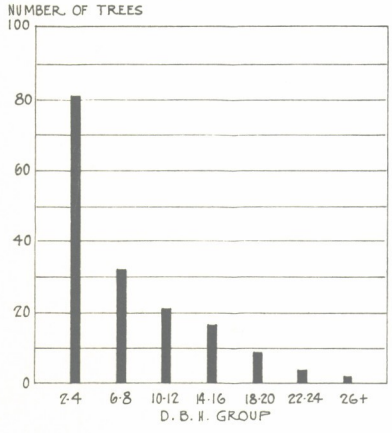
OLD GROWTH HEMLOCK - HARDWOOD STANDS

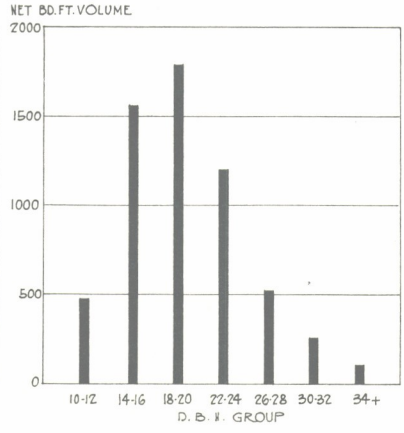
SOUTH HALF OF LOWER PENINSULA

Michigan - 1935

DBH Group	SPECIES												
	Hemlock	White & Norway Pine	Other Conifers	Sugar Maple	Yellow Birch	Bass-wood	Elm	Beech	Oaks	Paper Birch	Aspen	Misc.* Hdwds.	All Species	Cull Trees
	NUMBER OF TREES													
2-4	.49	-	-	22.32	-	2.82	6.26	9.81	1.48	-	2.09	35.47	80.74	1.84
6-8	-	.03	-	6.84	.21	2.76	5.06	2.91	2.39	.03	.27	10.85	31.35	1.26
10-12	-	.03	-	4.11	.03	2.20	3.38	2.64	2.08	.03	.46	5.97	20.93	.86
14-16	-	-	-	3.47	-	1.78	2.61	1.96	2.24	-	.12	4.17	16.35	.95
18-20	-	-	-	2.02	.03	.74	1.81	.89	1.38	-	.15	2.14	9.16	.80
22-24	-	-	-	.86	-	.37	1.01	.24	.51	-	.06	0.54	3.59	.30
26 +	-	-	-	.36	-	.15	.40	.12	.36	-	.06	0.21	1.66	.21
Total	.49	.06	-	39.98	.27	10.82	20.53	18.57	10.44	.06	3.21	59.35	163.78	6.22
	NET BOARD FOOT VOLUME													
10-12	-	1.9	-	92.4	.8	50.1	59.2	35.8	65.2	.3	26.6	152.5	484.8	
14-16	-	-	-	336.5	-	191.4	239.5	141.0	233.5	-	18.0	398.3	1558.2	
18-20	-	-	-	433.0	5.3	189.6	283.6	167.0	271.3	-	33.3	419.9	1803.0	
22-24	-	-	-	314.6	-	134.8	328.4	49.9	168.9	-	20.9	167.6	1185.1	
26 +	-	-	-	187.7	-	81.6	198.9	58.3	186.4	-	38.9	127.1	878.9	
Total	-	1.9	-	1364.2	6.1	647.5	1109.6	452.0	925.3	.3	137.7	1265.4	5910.0	
	TOTAL CUBIC FEET**													
6-8	-	.1	-	36.7	1.1	11.6	17.7	11.6	12.6	.1	1.2	46.0	138.7	3.4
10-12	-	.6	-	62.6	.5	30.9	46.7	36.8	31.3	.3	9.0	86.6	305.3	9.3
14-16	-	-	-	110.7	-	55.7	80.6	56.8	69.7	-	4.9	126.9	505.3	21.4
18-20	-	-	-	113.0	1.4	48.1	81.6	48.3	71.7	-	9.8	111.4	485.3	35.1
22-24	-	-	-	78.2	-	33.8	89.8	14.7	43.3	-	6.0	45.2	311.0	20.5
26 +	-	-	-	46.6	-	19.2	49.1	15.8	45.6	-	10.3	31.8	218.4	21.3
Total	-	.7	-	447.8	3.0	199.3	365.5	184.0	274.2	.4	41.2	447.9	1964.0	111.0

* Miscellaneous hardwoods include all hardwood species not individually listed.
** Includes an insignificant amount of aspen pulpwood.





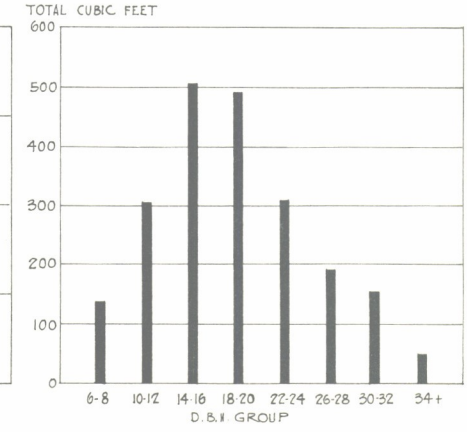


TABLE 26

CEDAR PRODUCTS

BY ECONOMIC UNITS AND CHARACTER OF STAND

Michigan
1935

Thousands of Pieces

Economic Unit	In All Stands	In Merchantable 1 Stands of			In Scattered Stands
		Swamp Types	Spruce-Balsam	All Other Types	
CEDAR POLES 2					
Upper Peninsula					
West Half	11,259	4,211	2,123	4,146	779
East Half	9,662	3,673	3,009	1,950	1,030
Lower Peninsula					
North Half	1,940	443	662	410	425
South Half	63	23		19	21
ENTIRE STATE	22,924	8,350	5,794	6,525	2,255
CEDAR POSTS (ROUND)					
Upper Peninsula					
West Half	11,079	3,718	2,217	3,621	1,523
East Half	59,646	19,679	17,073	9,466	13,428
Lower Peninsula					
North Half	21,169	5,082	4,907	3,838	7,342
South Half	268	85		54	129
ENTIRE STATE	92,162	28,564	24,197	16,979	22,422
CEDAR POSTS (SPLIT)					
Upper Peninsula					
West Half	17,629	6,339	3,648	6,790	852
East Half	33,647	12,937	10,602	6,879	3,229
Lower Peninsula					
North Half	5,487	1,254	1,818	1,153	1,262
South Half	54	12		32	10
ENTIRE STATE	56,817	20,542	16,068	14,854	5,353

1 All stands of sawtimber or cordwood size are here considered merchanatable.
2 About 16 per cent of the cedar poles are less than 20 feet long.

TABLE 27

CULL IN MERCHANTABLE TREES

AS PERCENTAGE OF GROSS TREE VOLUME

IN FOUR ECONOMIC UNITS

Michigan

Species	UPPER PENINSULA		LOWER PENINSULA	
	West Half	East Half	North Half	South Half
Sugar Maple (old growth)	20	19	13	15
Sugar Maple (second growth)	10	10	10	10
Yellow Birch (old growth)	20	20	15	15
Yellow Birch (second growth)	15	15	12	
Basswood	25	21	10	10
Elm	15	21	10	15
Beech	20	20	15	20
Black Ash	20	19	25	20
Red Maple	30	25	20	15
Paper Birch	20	10	10	15
Norway Pine	5	6	7	10
White Pine	15	10	10	10
Jack Pine	5	5	7	10
Spruce	5	5	5	5
Balsam Fir	20	12	10	10
Red Oak	15	15	15	10
White Oak	15	12	10	10
Hemlock	25	21	20	15

These cull factors allow for long butts, upper cull sections and other material commonly left in the woods (other than cull trees) as well as for sweep and other milling losses due to defects.